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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,732	04/25/2001	Craig S. Sander	039153-0433 (C167596-CIP)	1672

7590 12/03/2003

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EXAMINER

NGUYEN, THANH T

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/042,732

Applicant(s)

SANDER ET AL.

Examiner

Thanh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 19-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Oath/Declaration

Oath/Declaration filed on 5/14/03 has been considered.

Claim Rejections - 35 USC § 112

Claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 19, 22, 26 recite “a minimum lithographic feature” is being indefinite because it is unclear what is “a minimum lithographic feature”. It is suggested to delete the limitation or further explain the limitation.

Claim 33 recites the limitation “the conductive layer” and “the another conductive material”. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change to “the conductive material consisting of polysilicon and tungsten”.

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (U.S. Patent No. 5,940,710) in view of Lucas et al. (U.S. Patent No. 6,287,951).

Referring to figures 2a-2e, Chung et al. teaches an integrated circuit including at least a pair of local interconnects with one interconnect on each side of gate transistor, the integrated circuit being manufactured by a method comprising the steps of:

Forming on a semiconductor substrate (1) a thick insulating layer (6);

Forming at least a pair of space apart openings (30) in the insulating layer adjacent the semiconductor substrate (1);

Forming a source (14) in one of the openings (30) and the drain (14) in one of the openings;

Filling each of the openings with a conductive material (8) to form the local interconnects (8), the local interconnect being electrically couple to the source and drain (14);

Removing a portion of the insulating layer (6) to form a gate opening between the local interconnects (8);

Forming a gate dielectric (4) on the semiconductor substrate (1) in the gate opening; and

Forming the gate (5) on the gate dielectric layer.

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With regard to claims 25-26, 28-31, the terms “forming”, “filling”, “removing”, “etch selectivity relative to” is method recitations in a device claimed, and they are non-limiting, because only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Regarding claim 32, see figure 2e.

Regarding to claim 33, see figure 2e, col. 6, lines 10-11 (in view of the 112 rejection above).

Regarding to claims 37-38, the term “etching stop layer is formed on semiconductor substrate before forming the thick insulating layer” and “the etching selectivity” is method recitations in a device claimed, and they are non-limiting, because only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Chung et al. teaches all of the limitations as described in the claimed invention above. However, Chung et al. does not teach or suggested an etching stop layer, and forming barrier layer Titanium nitride before forming a conductive material tungsten.

Lucas et al. teaches forming an etching stop layer (20/22, silicon nitride) before forming the thick insulating layer (24), forming a barrier layer titanium nitride (72) in the opening (61) and forming a conductive material tungsten (74).

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Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time the invention was made would form an etching stop layer (silicon nitride) before forming the thick insulating layer, forming a barrier layer titanium nitride in the opening and forming a conductive material tungsten in process Chung et al. as taught by Lucas et al. because the process would prevent the chemical reaction between the conductive layer and the substrate by diffusion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (703) 308-9439, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached on (703) 308-4940. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (See **MPEP 203.08**).



Thanh Nguyen
Patent Examiner
Patent Examining Group 2800